

# General Index

## A

- Abnormal growth, 13, 15, 19, 21, 101  
*Abudefduf saxatilis*, 191  
*Acantharchus pomotis*, 121  
*Acipenser (sturio) ozyrhynechus*, 191  
*Acris crepitans*, 101  
*Aequiptecten*, 192; *irradians*, 175  
*Agardhiella*, 173  
Age and growth,  
    crab, 151  
    fish, see cobia, striped bass, white perch, yellow perch  
    pines, 152-3  
    snail, 163-5  
    squid, 138-44  
*Alcyonidium polyoum*, 150, 151; *verrilli*, 151  
*Alectis crinitis*, 191  
Alewife, 121, 179  
Alkalinity determinations, 119  
Allometric growth, squid, 144  
*Alopias*, 192; *vulpinus*, 177, 191, 192  
*Alosa*, sp., 15, 192; *mediocris*, 28, 121, 178, 191; *pseudoharengus*, 121, 179, 191; *sapidissima*, 39, 171, 191  
*Alutera schoepfi*, 189, 191  
Amberjack, greater, 184  
Ambicoloration, fish, 151-2  
*Ambystoma opacum*, 101  
*Amia calva*, 121  
Amphibian, scoliosis, 101-2  
*Anchoa*, 180, 192; *hepsetus*, 179, 191; *mitchilli*, 121; *mitchilli mitchilli*, 179, 191  
Anchovy, Bay, 121, 179; striped, 179  
*Anguilla rostrata*, 121, 180, 191  
Anguillidae, 180  
*Apeltes quadracus*, 182, 191, 192  
*Aphredoderus sayanus*, 121  
*Archosargus probatocephalus*, 185, 191, 192  
*Artemia salina*, 48  
Artificial fertilization, fish, 6, 14, 39  
Assawoman Bay, Md., 173, 174  
*Astroscopus guttatus*, 186, 191  
Atherinidae, 187  
Azine, 130  
*Azinoides*, 130; *gracilis*, 130; *tylosuri*, 130

## B

- Bacteriological survey, Tangier Sound, 167-71  
*Bagre marina*, 190, 191  
*Bairdiella chrysura*, 184, 191  
*Balistes capricornis*, 188, 191, 192; *vetula*, 189, 191, 192  
Balistidae, 189  
Banded pygmy sunfish, 121

- Barnacle infestations, blue crab, 150  
Barnacle, turtle, 150  
Barracuda, great, 187  
Basket shell, eroded, 161  
Bass, black, sea, 182; sea, 184; see also largemouth, smallmouth, striped  
Batrachoididae, 190  
Bay anchovy, 121, 179  
Bayless, J., see Keup, L.  
"Bay Perch," 5  
Behavior, fish, 71, 180, 186  
Belonidae, 180  
Black crappie, 38  
Black drum, 185  
Black locust, 214  
Black sea bass, 182  
Black water swamps, description of, 95  
Blennies, 192  
Blennidae, 187  
Blenny, feather, 187; striped, 187  
Blood samples, crab, 115-7  
Blue crab, 175  
    aging, 151  
    barnacle infestation, 150  
    calcium determinations, 115-7  
    fouling organisms, shell, 150  
    length increment, terminal molt, female, 114-8  
    peeler, red-line, 115, 177, 183  
    salinity tolerance, 114, 117  
    size variation, 114-6  
Bluefish, 127, 176, 183  
Bluegill, 38, 121  
Blue runner, 183  
Bluespotted sunfish, 31, 34-37, 121-2  
Bluntnose stingray, 178  
Body-scale-length ratio, fish, 146  
Bookhout, T. A., 213-5  
Bothidae, 188  
Bottom sampler, Corer, 167-9  
Bowfin, 121  
Brackish water clam, 209-12  
*Brevoortia tyrannus*, 39, 121, 179, 191  
Bridle shiner, 121  
Brine shrimp, 7, 48  
*Buccinum undatum*, 151  
Bullhead, brown, 121; yellow, 121  
Burrfish, striped, 189  
Butterfish, 127, 187  
Butterfly fish, spotfin, 185-6  
Butterfly ray, smooth, 178

## C

- Callinectes*, 192; *sapidus*, 150, 175  
*Cancer irroratus*, 151  
Cannibalism, fish, 8, 40  
Carangidae, 183  
*Caranz crysos*, 183, 191, 192; *hippos*, 183, 191, 192

- Carcharhinidae, 177  
*Carcharhinus milberti*, 177, 191  
*Carcharias taurus*, 176, 191, 192  
Carchariidae, 176  
*Carcinonemertes carcinophila*, 151  
Carp, 121  
Carpenter frog, 97  
*Carya* spp., 214  
Catfish, 190; brown, 180; channel, 121; white, 121, 189  
Centrarchidae, 122, 183  
*Centrarchus macropterus*, 121  
*Centropomus striatus*, 182, 184, 191  
*Ceramium rubrum*, 175  
*Cervus nippon*, 212  
*Chaenobryttus gulosus*, 121  
*Chaetodipterus faber*, 191  
*Chaetodon ocellatus*, 185, 191, 192  
Chaetodontidae, 185  
*Chaetomorpha aerea*, 175  
*Chanos chanos*, 194, 197, 198  
Characins, 194  
*Chasmodes bosquianus*, 187, 191, 192  
*Chelonibia patula patula*, 150  
Chemical sensing, snail, 163  
Chenoweth, S. B., see Cooper, R. A.  
*Chilomycterus schoepfi*, 189, 191  
*Chirostoma morone*, 11  
Chlorinity determination, 119  
*Chologaster cornuta*, 121  
Chubsucker, creek, 121; lake, 121  
Clam, see also quahog  
    brackish water, 209  
    fossil deposits, 210-1  
    hydraulic dredge, 200, 201, 209  
    soft-shelled, 209  
    spawning, 209  
    surf, 177-8, 185  
Clarke-Bumpus sampler, 82  
Clearnose skate, 178  
Clingfish, 189, 192  
*Clupea harengus harengus*, 179, 191  
Clupeidae, 178  
CO<sub>2</sub> determination, 119  
Cobia, 67-71  
Cobia, (R/V) C.B.L., 88  
Coliforms, 167-70  
Compensatory growth, fish, 145-9  
Condition index, quahog, 155  
*Conochilus*, 197  
Cooper, R. A., 155-60  
*Coregonus artedii*, 145  
Coriolis effect, 112, 207  
Cotidal hour, 103  
Cownose ray, 178  
Crab, lady, 175; see blue crab  
*Crangon septemspinosa*, 176  
Crappie, black, 38; white, 38, 121  
Croaker, Atlantic, 5, 121-2, 185  
Culture methods, bacteria, 169  
Cunner, 186  
Current hour, 106-9  
Current meter, Roberts, 103

Currents, Chesapeake Bay, 105  
 Cusk-eel, striped, 187  
 Cutlass fish, 68  
*Cynoscion nebulosus*, 184, 191;  
*regalis*, 184, 191  
*Cypelurus heterurus*, 181, 191  
 Cyprinodontidae, 181  
*Cyprinodon variegatus*, 181, 191  
*Cyprinus carpio*, 121, 190, 191

## D

Darter, Johnny, 37, 121  
 Darter, sawcheek, 121  
 Darter, scalyhead, 121  
 Dasyatidae, 178  
*Dasyatis americana*, 178, 191, 192;  
*saysi*, 178, 191, 192  
 Davis, J., 212  
 Davis, N. W., see Flyger, V.  
 Demersal, eggs, fish, 10  
 de Sylva, D. P., see Smith, R. E.  
 Diodontidae, 189  
 Dogfish, smooth, 177  
 Dogfish, spiny, 178  
*Dorosoma cepedianum*, 194, 198;  
*petenense*, 194, 195, 198  
 Dovel, W. L., 77-90  
 Drobeck, K. G., see Pfitzenmeyer,  
 H. T.  
 Drum, black, 185; red, 185  
 Dye retention, clam, 135-6

## E

Echeneidae, 189  
*Echeneis naucrates*, 189, 191  
*E. coli*, 167, 169-70; density, 167,  
 169-70  
 Eel, American, 121, 180  
 Egg, fishes, see cobia, cutlass fish,  
 striped bass, white perch,  
 yellow perch  
*Elassoma zonatum*, 121  
*Eleutherodactylus ricordi*, *plani-*  
*rostris*, 97  
*Elops saurus*, 121  
 Engraulidae, 179  
*Enneacanthus gloriosus*, 31, 34-6,  
 121, 122; *obesus*, 121  
*Enteromorpha intestinalis*, 175; sp.,  
 175  
*Epinephelus niveatus*, 182, 191,  
 192  
*Erimyzon oblongus*, 121; *succetta*,  
 121  
*Eropus microstomus*, 191  
 Esocidae, 179  
*Esox americanus*, 121, 122; *niger*,  
 121, 122, 180, 190, 191;  
*americanus americanus*, 179,  
 190-1  
*Etheostoma barratti*, 121; *nigrum*,  
 37, 121; *serriferum*, 121  
*Etropus crossotus*, 188, 191-2; *in-*  
*termedius*, 184; *microstomus*,  
 188, 192  
*Eucinostomus argenteus*, 184, 191-2  
 Euryhalinity, fish, 4, 31

## F

Fertilization, fish, artificial, 6, 14,  
 39

Filefish, orange, 189  
*Fistularia tabacaria*, 191  
 Flier, 121  
 Flounder, 176, 183, 185; fringed,  
 188; southern, 121-2; sum-  
 mer, 151, 182, 188, 192; win-  
 ter, 188  
 Flow rate determinations, water  
 sampler, 82  
 Flyger, V., 212-3  
 Flying fish, Atlantic, 181  
 Fouling organisms, 150  
 Frog  
   carpenter, 97  
   dimorphism, sexual, 93  
   greenhouse, 97  
   leopard, 101-2  
   pickerel, 91-100  
   scoliosis, 101-2  
*Fundulus*, 185; *diaphanus*, 181,  
 191; *heteroclitus*, 121; *heter-*  
*oclitus marcolepidotus*, 181,  
 191; *luciae*, 190, 191; *ma-*  
*jalis*, 121, 181, 191; *notti*,  
 121; *vesiculosus*, 175

## G

Gadidae, 181  
*Gadusia chapra*, 194, 197  
*Gadus morhua*, 191  
*Gambusia affinis*, 121; *affinis hol-*  
*brooki*, 181  
 Gar, longnose, 121  
 Gasterosteidae, 181  
*Gasterosteus aculeatus*, 190, 191  
 Gastrocotylidae, 124, 130  
 Gastrocotylinae, 132  
 Geckler, J. R., 134-37  
*Gemma gemma*, 162  
 Gene flow, fish, 4  
 Genys, J. B., 152-3  
 Gerridae, 184  
 Gobies, 192  
 Gobiesocidae, 189  
*Gobiosox strumosus*, 189, 191  
 Gobiidae, 186  
*Gobionellus stigmaticus*, 121  
*Gobiosoma boscii*, 121, 185, 191,  
 192; *ginsburgi*, 186, 191  
 Goby, green, 186; marked, 121;  
 naked, 121, 186; seaboard,  
 186  
*Gonioplasius*, 124  
 Goosefish, 190  
*Gracilaria ferox*, 175  
 Grouper, snowy, 182  
 Growth, see age  
 Gulf, I-A, High Speed Sampler  
 modification, 72-76  
*Gymnura micrura*, 178, 191

## H

Haefner, Paul A., Jr., 114-8, 138-44  
 Hake, silver, 181; spotted, 182;  
 squirrel, 182  
 Halfbeak, 180-1  
 Hardy, J. D., Jr., 91-100, 101-102  
 Harvest fish, 125; southern, 187  
 Hatching boxes, fish, 47, 48  
 Heliotropism, fish, 22  
 Hemiramphidae, 180

*Hemiramphus* sp., 180; (*unifas-*  
*ciatus*), 191  
 Hemolymph sampling, crab, 116  
 Hermaphroditism, fish, 5  
 Herring, 190; Atlantic, 179; At-  
 lantic thread, 179; lake, 145  
*Heterotis niloticus*, 198  
 Hibernation, clam, 137  
 Hickories (trees), 214  
 Hicks, S. D., 103-113  
 High speed sampler, 72-6  
*Hilsa ilisha*, 194, 197  
*Hippocampus erectus hudsonius*,  
 182, 191  
 Hogchoker, 121, 188-9  
 Hoss, D. E., see White, J. C.  
 Houndfish, 180  
*Hybognathus nuchalis*, 121  
*Hydractinia echinata*, 150, 151  
*Hyla crucifer*, 101; *versicolor*, 101  
*Hypsoblennius hentzi*, 187, 191

## I

Ichthyoplankton movement, estu-  
 arine, 77  
 Ichthyoplankton, studies of Ches-  
 apeake Bay, 38  
 Ictaluridae, 180  
*Ictalurus catus*, 121, 180, 190, 191;  
*natalis*, 121; *nebulosus*, 121,  
 180; *punctatus*, 121  
 Incubation, see hickory shad,  
 striped bass, white perch,  
 yellow perch  
 Infusoria, as fish food, 7  
*Isochrysis*, 134  
 Isohalines, Chesapeake Bay, 69

## J

Jack crevalle, 183  
 Jones, A. W., see Vaughn, M. W.  
 Joseph, E. B., 67-71  
 Joseph, E. B., see Davis, J.

## K

*Keratella*, 197  
 Keup, L., 119-123  
 Killifish, 185; banded, 181; rain-  
 water, 121, 181; striped, 121  
 Kingfish, northern, 185  
*Komisirus punctatus*, 194, 198

## L

Labridae, 185  
 Ladyfish, 121  
*Lagodon*, 184; *rhomboides*, 121-2,  
 185, 191, 192  
 Lamnidae, 177  
 Largemouth bass, 31, 33-8, 121-2  
*Larimus fasciatus*, 191  
 Lee's phenomenon, fish, 149  
*Leiostomus xanthurus*, 5, 121, 122,  
 184, 191  
*Lepisosteus osseus*, 121  
*Lepomis auritus*, 31, 37, 38, 121;  
*gibbosus*, 31, 34-8, 121, 122;  
*macrochirus*, 38, 121; *mar-*  
*ginatus*, 121  
*Lepomis gibbosus*, 183, 190, 191  
*Libinia*, 192; *dubia*, 175; *emargi-*  
*nata*, 175

*Limulus*, 151  
 Linear regression, fish growth, 26  
*Lithidocotyle*, 130; *acanthophallus*, 131, 132  
 "Little neck clams," 209  
 Live container, crab, 115  
 Livellara, R. A., see Smith, R. E.  
 Lizard fish, inshore, 180  
 Locust, black, 214  
*Loligo*, 192; *opalescens*, 138, 143; *pealei*, 138, 139, 140, 142, 143, 144, 175; *vulgaris*, 138  
*Lolliguncula*, 192; *brevis*, 138, 139, 140, 142, 143, 144, 175  
 Lookdown, 184  
 Lophiidae, 190  
*Lophius americanus*, 190, 191  
*Lucania parva*, 181, 191  
*Lucioperca*, 21  
*Lutodeira* (*Chanos*) *Chanos*, 194

## Mc

McErlean, A. J., 200-8  
 McMahon, John W., 124-33

## M

Mackerel, Spanish, 130  
*Macoma baltica*, 200-8, 209; *phenax*, 209  
 Mansueti, Alice J., 46-66  
 Mansueti, R. J., 3-45  
 Marshall, N., see Cooper, R. A.  
 Massmann, W. H., see Joseph, E. B.  
*Megalops atlantica*, 191  
*Membras martinica*, 71, 187, 188, 191  
 Menhaden, 39; Atlantic, 121, 179  
*Menidia*, 178, 180, 185, 188; *beryllina*, 121, 188, 191; *menidia*, 188, 191  
*Menticirrhus americanus*, 191; *saxatilis*, 185, 191  
*Mercenaria mercenaria*, 134, 136, 155, 175, 176, 177, 186, 192  
 Meristics, fish, 8, 20, 26, 27, 28, 49, 58, 60-3  
*Merluccius bilinearis*, 181, 191  
*Metamicrocotyla*, 124  
 Metering block, 80  
 Meter nets, 67, 72, 78, 81, 82, 86  
*Microcotyle*, 124, 125; *acanthophallus*, 131; *peprik*, 127; *pomatomi*, 127; *poronoti*, 125, 127; *scomberomori*, 131; *stenotomi*, 130  
 Microcotylidae, 124  
 Microcotylinae, 124, 125  
*Microgadus tomcod*, 181, 191  
*Microgobius*, 192; *thalassinus*, 185, 191  
*Micropogon undulatus*, 5, 121, 122, 185, 191  
*Micropterus dolomieu*, 33, 38; *salmoides*, 31, 33, 38, 121, 122  
 Miller, R. V., 194-9  
 Minnow, sheepshead, 181; silvery, 121  
*Mnemiopsis* sp., 175, 192  
 Mojarra, spotfin, 184  
*Mola mola*, 189, 191, 192

*Molgula manhattensis*, 81  
 Molidae, 189  
*Monostyla*, 197  
 Moonfish, Atlantic, 184  
 Morphometrics, fish, 8, 11-8, 21-7, 49, 58, 60-3  
 Morphometry, squid, 138-44  
 Mortality, fish egg, 7; pines, 153  
 Mosquitofish, 121, 181  
 Movement, fish, 71, 77  
*Moxostoma collapsum*, 121  
 Mudminnow, Eastern, 121  
 Mud snail, 161-6  
*Mugil cephalus*, 121, 187, 191, 192; *curama*, 187, 191  
 Mugilidae, 187  
 Mullet, striped, 121, 187; white, 187  
 Mummichog, 121, 181  
*Mustelus canis*, 177, 191  
*Mya arenaria*, 201, 209  
*Mycteroperca microlepis*, 191  
 Myliobatidae, 178  
 Myotome count, fish, 20, 26, 58, 60, 61  
*Mytilus edulis*, 175, 185

## N

Naked goby, 121, 186  
*Nassarius obsoletus*, 161, 162, 163, 164  
*Naucratis*, 192; *ductor*, 183, 191  
 Nauplii, as fish food, 7, 48  
 Needlefish, 130; Atlantic, 121, 180  
*Negapion*, 192; *brevirostris*, 177, 190, 191, 192  
 Nemertean worms, 151  
 Neuse River, fish distribution, 119  
 Nicholson, W. R., 145-9  
 Norcross, J. J., see Joseph, E. B.  
*Notemigonus crysoleucas*, 121  
*Notropis amoenus*, 121; *bifrenatus*, 121; *chalybaeus*, 121; *cummingsae*, 121; *hudsonius*, 121; *procne*, 121  
*Noturus gyrinus*, 121

## O

*Odocoilus virginianus*, 213  
 Opididae, 187  
*Opisthonema oglinum*, 179, 191  
*Opsanus tau*, 190, 191  
*Orthopristis chrysopterus*, 184, 185, 191, 192  
*Osmorus mordax*, 191  
 Osmotic stress, clam, 206  
 Ossification, fish, 63  
*Ovalipes*, 192; *ocellatus ocellatus*, 175  
 Overwintering, fish, 5, 190  
 Oxygen determination, 119; Winkler, 120

## P

*Palaeomonetes intermedius*, 176  
*Paralichthys dentatus*, 152, 188, 191; *lethostigma*, 121, 122  
 Peeler, blue crab, 115, 177, 183  
*Peprius alepidotus*, 127, 187, 191; *paru*, 190, 191

*Perca flavescens*, 31, 33-6, 40, 46, 50-3, 55-7, 59-64, 121-2, 183, 190, 191; *fluviatilis*, 55, 56, 64  
 Perch, "Bay," 5; log, 37; ocean, see redfish; pirate, 121; silver, 184; white, 3-45; 49, 54, 62, 121, 182; yellow, 31, 33, 39, 40, 46-64, 121-2, 183, 190; yellow-European, 55, 64  
 Percidae, 183  
*Percina caprodes*, 37  
 Phitzemeyer, H. T., 209-12  
 pH determinations, 119  
 Pharyngeal organs, fish, 194-7  
 Phototropism, fish, 22  
 Pickerel, chain, 121-2, 180  
 Pickerel frog, 91-100  
 Pickerel, redfin, 121-2, 179-80  
 Pigfish, 184  
 Pike, 190  
 Pike perch, Walleye, 13, 33-6  
 Pilotfish, 183, 184  
 Pines  
   analysis of variance, 153  
   Austrian, 153  
   Chinese, 153  
   growth rate, 152-3  
   hybrids, 153  
   Japanese black, 152  
   Japanese red, 153  
   mortality, 153  
   Scotch, 152  
   Virginia, 214  
 Pinfish, 184, 185, 121-2  
*Pinus densiflora*, 153; *nigra*, 153; *sylvestris*, 152, 153; *tabulaeformis*, 153; *thunbergii*, 152, 153; *virginiana*, 214  
 Pipefish, 182  
 Pirate perch, 62, 121  
 Plankton samplers, 67, 72-76, 78, 82, 85, 86, 103  
 Plankton sampling, 67, 72, 77-90  
 Pleuronectidae, 188  
 Poeciliidae, 181  
*Pogonias cromis*, 185, 191, 192  
 Polluted waters  
   quahog condition in, 155-60  
 Polyarthra, 197  
*Poluopesthocotylea*, 130  
 Pomadasyidae, 184  
 Pomatomidae, 183  
*Pomatomus saltatrix*, 127, 132, 183, 191, 192  
*Pomoxis annularis*, 38; *nigromaculatus*, 38, 121  
 Porgy, northern, 130  
*Poronotus triacanthus*, 125, 187, 191  
 Porter, H. J., see Williams, A. B.  
*Potomegeton*, 202  
 Preservation, shrinkage, fish, 8; squid, 141  
*Prionotus carolinus*, 186, 191; *evolans*, 186, 191  
*Pseudazine*, 130; *mezicana*, 131  
*Pseudopleuronectes americanus*, 188, 191  
 Puffer, northern, 189  
 Pumpkinseed, 31, 34-8, 121-2, 183

## Q

Quahog, 155-160  
*Quercus* spp., 214

## R

*Rachycentron canadum* (Linnaeus), 67, 70, 191  
*Raja eglanteria*, 178, 191, 192;  
*ocellata*, 191  
 Rajiidae, 178  
*Rana palustris*, 91, 93, 94, 95, 98;  
*palustris palustris*, 95, 96;  
*palustris mansueti*, 91, 92,  
 93, 94, 95, 98; *pipiens*, 101;  
*sylvatica*, 101, 102; *vir-*  
*gatipes*, 97  
*Rangia cuneata*, 209, 210, 211  
 Ray, 176; cownose, 178; eagle, 178;  
 smooth butterfly, 178  
 Rearing pond, fish, 47, 48  
 Redbreast sunfish, 31, 37, 38, 121  
 Red drum, 185  
 Redfin pickerel, 121-2, 179-80  
 Redfish, southern occurrence, 212  
 Redhorse, V-lip, 121  
 Red-line peeler, crab, 115  
 Regression analysis, fish, 145  
*Rhinoptera bonasus*, 178, 191  
 Rhodamine B, 134-7  
*Rissola marginata*, 187, 191, 192  
*Robinia pseudoacacia*, 214  
*Roccus americanus*, 3, 4, 5, 7, 8, 9,  
 11, 12, 14-36, 38-40, 54, 121,  
 182, 191; *lineatus*, 131;  
*saxatilis*, 4, 13, 14, 18, 19, 21,  
 24, 26, 27, 28, 31, 33, 34, 35,  
 36, 39, 51, 131, 145, 147, 148,  
 182, 183, 191  
 Rock-weed, 151  
 Rotenone, fish collecting, 119  
 Rotifers, 197  
*Ruppia*, 202

**S**

Salinity  
 clam density determinant, 205,  
 206  
 isohalines, Chesapeake Bay, 69  
 Neuse R., N.C., 119-23  
 Pamlico Sound, N.C., 19-23  
 Saprogenous fungus, 7  
*Sarda sarda*, 191  
*Sardinops (sagax) coercolea*, 194,  
 197  
 Scale, body length ratio, fish, 146  
 Scheltema, R. S., 161-6  
 Schwartz, F. J., 172-93  
 Sciaenidae, 184  
*Sciaenops ocellata*, 185, 191  
 Scoliosis, Leopard frog, 101-2  
*Scomberocotyle*, 130  
*Scomberocotyle scomberocotyle*,  
 131; *scomberomori*, 130, 131  
*Scomberomorus cavalla*, 130, 131,  
 132, 190; *maculatus*, 130,  
 131, 132, 191  
*Scophthalmus aquosus*, 188, 191  
 Scup, 185  
*Scytosiphon lomentaria*, 175  
 Sea bass, 176, 184; black, 182  
 Seahorse, spotted, 182

Searobin, northern, 186; striped,  
 186  
 Sea squirts, 81  
 Seatrout, spotted, 184  
*Sebastes marinus*, 212; *marinus*  
*mentella*, 212  
 Sedgewick-Rafter counter, 194  
*Selene vomer*, 184, 191  
*Seriola*, 192; *dumerili*, 184, 191  
 Serranidae, 182  
 Sewage, water, examining meth-  
 ods, 169  
 Sexual Dimorphism, frog, 93  
 Shad  
 American, 39, 40, 179  
 gizzard, 198  
 hickory, 28, 49, 54, 121, 178  
 Japanese gizzard, 194, 198  
 threadfin, 194, 195, 197  
 Shark, brown, 184; hammerhead,  
 177, 184; lemon, 177, 184;  
 sand, 176-7; 176, 189, 191,  
 192  
 Shark sucker, 189  
 Sheephead, 185  
 Sheephead minnow, 181  
 Shiner, 121  
 Shrimp, 185; grass, 176, 178  
 Shrinkage at preservation, fish  
 eggs, 8  
 Shuster, Carl N., Jr., see Haefner,  
 P. A.  
 Sika deer, 42-3  
 Silver hake, 181  
 Silver perch, 184  
 Silversides, 71, 185  
 Atlantic, 188  
 rough, 187  
 tidewater, 121, 188  
 Skates, 178, 192  
 Skilletfish, 189  
 Skunk, spotted, 213  
 Sled, plankton, 77-81  
 Smallmouth bass, 33, 38  
 Smith, R. E., 72-6  
 Snail, see mud  
 Snowy grouper, 182  
 Soft-shelled clam, 209  
 Soleidae, 188  
 Sparidae, 185  
*Sphaeroides maculatus*, 189, 191  
*Sphyraena*, 192; *barracuda*, 187,  
 191; *borealis*, 187  
 Sphyraenidae, 187  
*Sphyrna*, 192; *zygaena*, 177, 191,  
 192  
 Sphyrnidae, 177  
*Spilogale p. putorius*, 213  
 Spiny dogfish, 178  
 Spot, 5, 121-2, 184-5  
 Spotfin butterfly fish, 185-6; mo-  
 jarra, 184  
 Spotted hake, 182; seahorse, 182;  
 seatrout, 184  
 Squalidae, 178  
*Squalus acanthias*, 178, 191  
 Squid, 138-44  
 Squirrel hake, 182  
 Stain, 49, 195  
 Staining, clams, 134; fish, 49  
 Standard Plate Count (SPC) tech-  
 nique, 169, 170

Stargazer, northern, 186  
 Starhead topminnow, 121  
*Stenotomus chrysops*, 130, 185, 191  
 Sticklebacks, 192; fourspine, 182  
 Stingray, bluntnose, 178  
 Stingrays, 178, 189  
*Stizostedion vitreum*, 13, 34, 35,  
 36, 47  
 Stress, towing cable, 74  
 Striped bass, 4, 5, 13, 15, 19, 21,  
 24, 26, 27, 28, 31, 33, 34, 35,  
 36, 39, 49, 51, 54, 58, 145-9,  
 182, 183  
 Stromateidae, 187  
*Strongylura marina*, 121, 180, 191;  
*raphidoma*, 180  
 Subpopulation, fish, 4  
 Summer flounder, 151-2, 182, 188,  
 192  
 Sunfish, banded, 121; banded  
 pygmy, 121; bluespotted, 31,  
 34, 35, 36, 37, 121-2; dollar,  
 121; mud, 121; ocean, 89-90;  
 redbreast, 31, 37, 38, 121  
 Swamp, "black water," 95  
 Swampfish, 121  
 Swellfish, 192  
 Syngnathidae, 182  
*Syngnathus floridae*, 182, 191, 192;  
*fuscus*, 182, 191, 192  
 Synodontidae, 180  
*Synodus foetens*, 180, 191, 192

## T

Tadpole madtom, 121  
 Tautog, 176, 185, 186, 191, 192  
*Tautoglabrus adspersus*, 186, 191  
 Terminology, fish, 9, 49  
 Test chambers, clam, 134  
 Tetraodontidae, 189  
*Thoracocotyle*, 130, 132; *crocea*,  
 132; *croceus*, 132; *paradoxi-*  
*ca*, 132  
 Tidal characteristic, see wave  
 Tide, see also wave  
 Chesapeake Bay, 110  
 classification, 110  
 equilibrium, 106  
 James River, 110  
 Little Creek, 110  
 measurements, 103, 106  
 Patuxent River, 110  
 Potomac River, 110  
 range—Chesapeake Bay, 106-8  
 stations, continuous, 103  
 York River, 110  
 Tide stations, Chesapeake Bay,  
 104  
 Toadfish, 190  
 Tomcod, Atlantic, 181-2  
 Topminnow, starhead, 121  
 Tracer, water movement, 134  
 Trematodes, monogenetic, 124-33  
 Triakidae, 177  
*Trichurus lepturus*, 68, 190, 191  
*Trichocerca*, 197  
 Triggerfish, gray, 189  
 Triggerfish, Queen, 189  
 Trigidae, 186  
*Trinectes maculatus*, 121, 188, 191  
 t-test, 116, 147

Tunicate, 81  
Turtle barnacle, 150-1  
*Tylosurus marinus*, 130

U

*Ulva*, 163, 175  
*Umbra pygmaea*, 121  
Uranoscopidae, 186  
*Urophycis chuss*, 182, 191; *regius*,  
182, 191

V

Variance, analysis of, pine trees,  
153  
Vaughn, M. W., 167-71  
*Venus*, 134, 137  
Vertebral count, fish, 15, 60  
*Vitis* spp., 214  
*Vomer setapinnis*, 184, 191

W

Walleye, pike perch, 13, 33-6, 47  
Wandstrat, T. A., see Geckler, J.  
R.  
Warmouth, 121  
Water movement, tracer, 134  
Wave, tidal  
Bay of Fundy, 112  
Chesapeake Bay, 106, 112  
classification, 106, 110  
coriolis effect, 112  
cosine form, 112  
current hour, 106-9  
currents, 105  
Delaware Bay, 112  
hours, cotidal, 103, 106, 107  
Juan de Fuca-Georgia straits,  
112  
Long Island Sound, 112  
lunar, 106

primary, 110  
secondary, 110, 112  
solar, 106  
Weakfish, 184  
Weight-length relationship, squid,  
139-43  
White catfish, 121, 180  
White crappie, 38, 121  
White, J. C., 151-2  
White perch, 3-45, 49, 54, 62, 121,  
182  
Whitetail deer, 213  
Williams, A. B., 150-1  
Windowpane, 188

Y

Yellow perch, 31, 33-6, 39, 40, 46-  
64, 121-2, 183, 190

Z

*Zostera*, 173, 178, 202; *marina*, 175



# *CHESAPEAKE SCIENCE*

A REGIONAL JOURNAL OF RESEARCH AND PROGRESS ON NATURAL RESOURCES

*Volume V, 1964*

TED S. Y. KOO

*Managing Editor*

*Published By*

Natural Resources Institute of the  
University of Maryland  
Chesapeake Biological Laboratory  
Solomons, Maryland  
L. E. Cronin, Director



# Table of Contents

## NUMBERS 1-2, MARCH-JUNE, 1964

<b>Memoriam</b> .....	1
MANSUETI, ROMEO J. Eggs, larvae and young of the white perch, <i>Roccus americanus</i> , with comments on its ecology in the estuary.....	3
MANSUETI, ALICE JANE. Early development of the yellow perch, <i>Perca flavescens</i> .....	46
JOSEPH, EDWIN B., JOHN J. NORCROSS, AND WILLIAM H. MASSMANN. Spawning of the cobia, <i>Rachycentron canadum</i> , in the Chesapeake Bay, with observations of juvenile specimens .....	67
SMITH, ROBERT E., DONALD P. DESYLVA, AND RICHARD A. LIVELLARA. Modification and operation of the Gulf I-A high-speed plankton sampler .....	72
DOVEL, WILLIAM L. An approach to sampling estuarine macroplankton ..	77
HARDY, JERRY D., JR. A new frog, <i>Rana palustris mansuetii</i> , subsp. nov. from the Atlantic Coastal Plain .....	91
HARDY, JERRY D., JR. The spontaneous occurrence of scoliosis in tadpoles of the leopard frog, <i>Rana pipiens</i> .....	101

## NUMBER 3, SEPTEMBER 1964

HICKS, STEACY D. Tidal wave characteristics of Chesapeake Bay.....	103
HAEFNER, PAUL A., JR. AND CARL N. SHUSTER, JR. Length increment during terminal molt of the female blue crab, <i>Callinectes sapidus</i> , in different salinity environments.....	114
KEUP, LEWELL AND JACK BAYLESS. Fish distribution at varying salinities in Neuse River Basin, North Carolina.....	119
McMAHON, JOHN W. Monogenetic trematodes from some Chesapeake Bay fishes. Part II. The Superfamily Diclidophoroidea .....	124
GECKLER, J. R. AND T. A. WANDSTRAT. Uptake and retention of rhodamine B by quahog clams, <i>Mercenaria mercenaria</i> .....	134
HAEFNER, PAUL A., JR. Morphometry of the common Atlantic squid, <i>Loligo pealei</i> , and the brief squid, <i>Lolliguncula brevis</i> , in Delaware Bay ..	138
NICHOLSON, WILLIAM R. Growth compensation in four year classes of striped bass, <i>Roccus saxatilis</i> , from Albemarle Sound, North Carolina ..	145

## Notes and Comments

WILLIAMS, AUSTIN B. AND HUGH J. PORTER. An unusually large turtle barnacle ( <i>Chelonibia patula</i> ) on a blue crab from Delaware Bay.....	150
WHITE, JOHN C., JR. AND DONALD E. HOSS. Another record of incomplete ambicoloration in the summer flounder, <i>Paralichthys dentatus</i> .....	151
GENYS, JOHN B. Growth rates of Japanese black pines and Scotch pines in Maryland .....	152

## NUMBER 4, DECEMBER 1964

COOPER, R. A., S. B. CHENOWETH, AND N. MARSHALL. Condition of the quahog, <i>Mercenaria mercenaria</i> , from polluted and unpolluted waters ..	155
---	-----



SHELTEMA, RUDOLF S. Feeding habits and growth in the mud snail, <i>Nassarius obsoletus</i> .....	161
VAUGHN, M. W. AND A. W. JONES. Bacteriological survey of an oyster bed.....	167
SCHWARTZ, FRANK J. Fishes of Isle of Wight and Assawoman bays near Ocean City, Maryland.....	172
MILLER, ROBERT VICTOR. The morphology and function of the pharyngeal organs in the Clupeid, <i>Dorosoma petenense</i> (Gunther).....	194
McERLEAN, ANDREW J. Characteristics of the <i>Macoma balthica</i> populations in the Patuxent estuary.....	200

### Notes and Comments

PFITZENMEYER, H. T. AND K. DROBECK. The occurrence of the brackish water clam, <i>Rangia cuneata</i> , in the Potomac River, Md.....	209
DAVIS, J. AND E. B. JOSEPH. Southern record of <i>Sebastes marinus</i> , ocean perch.....	212
FLYGER, V., AND N. W. DAVIS. Distribution of Sika deer ( <i>Cervus nippon</i> ) in Maryland and Virginia in 1962.....	212
BOOKOUT, THEODORE A. The Allegheny spotted skunk in Maryland.....	213
<b>Index</b> .....	216